Enhancing Human Capability with Intelligent Machine Teammates

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ABSTRACT

Every team has top performers -- people who excel at working in a team to find the right solutions in complex, difficult situations. These top performers include nurses who run hospital floors, emergency response teams, air traffic controllers, and factory line supervisors. While they may outperform the most sophisticated optimization and scheduling algorithms, they cannot often tell us how they do it. Similarly, even when a machine can do the job better than most of us, it can't explain how. In this talk I share recent work investigating effective ways to blend the unique decision-making strengths of humans and machines. I discuss the development of computational models that enable machines to efficiently infer the mental state of human teammates and thereby collaborate with people in richer, more flexible ways. Our studies demonstrate statistically significant improvements in people's performance on military, healthcare and manufacturing tasks, when aided by intelligent machine teammates.

CCS Concepts/ACM Classifiers

• Artificial Intelligence ~ planning and scheduling

Author Keywords

Human-machine collaboration; planning and scheduling, collaborative robots

BIOGRAPHY

Julie Shah is an Associate Professor of Aeronautics and Astronautics at MIT and director of the Interactive Robotics Group, which aims to imagine the future of work by designing collaborative robot teammates that enhance human capability. As a current fellow of Harvard University's Radcliffe Institute for Advanced Study, she is expanding the use of human cognitive models for artificial intelligence. She has translated her work to manufacturing assembly lines, healthcare applications, transportation and defense. Before joining the faculty, she worked at Boeing Research and Technology on robotics applications for aerospace manufacturing. Prof. Shah has been recognized by the National Science Foundation with a Faculty Early Career Development (CAREER) award and by MIT Technology Review on its 35 Innovators Under 35 list. Her work on industrial human-robot collaboration was also in Technology Review's 2013 list of 10 Breakthrough Technologies. She has received international recognition in the form of best paper awards and nominations from the ACM/IEEE International Conference on Human-Robot Interaction, the American Institute of Aeronautics and Astronautics, the Human Factors and Ergonomics Society, the International Conference on Automated Planning and Scheduling, and the International Symposium on Robotics. She earned degrees in aeronautics and astronautics and in autonomous systems from MIT.

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